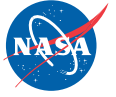




Human Factors

research and technology division



Upgrade in the Space Shuttle Cockpit Display Formats

Objective

In the two decades that the Space Shuttles have been operating, dramatic advances have occurred in display technology and user interface design. Capitalizing on these advances, the Cockpit Avionics Upgrade project (based at NASA Johnson Space Center) is redesigning the display formats on the liquid crystal displays (LCDs) of the Space Shuttle cockpit. The objective of the redesign is to enhance flight safety by presenting the crew with flight- and vehicle-critical information in a user-friendly form that enhances situational awareness.



Simulated Shuttle Cockpit Upgrade

Approach

Human Factors experts from NASA Ames Research Center are helping design and evaluate upgraded displays that present complex information in an intuitive manner. Current display formats make only limited use of graphics. The upgraded displays typically provide more of their information in a graphical form that better matches the operator's mental model of the system being depicted. For example, the proposed display format for the reaction control system includes a graphic depiction of jet availability, enabling the crew to tell "at a glance" which jets can be fired and which are unavailable. The existing displays are also primarily monochromatic, making it difficult for an observer to locate and focus attention on a critical piece of information such as an off-nominal parameter. The proposed display formats exploit a color-coding scheme to reduce clutter and help manage the viewer's attention. For example, critical parameter readings (such as temperatures and pressures) turn red when the reading is off-nominal. The value then becomes a color singleton that draws the viewer's attention automatically.

Impact

The new display formats should give the crew better and more rapid decision-making capability under off nominal conditions, enhancing flight safety and the crew's ability to meet mission objectives.

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